

2020 Spartan/Rescue 1



Rescue Squad

Key Differences vs. 2008 Pierce



- Taller, Longer, Heavier
- Manual generator transfer switch
- Rated high anchor points
- Stronger winches
- Cab changing room

Dimensions & Weight



- Overall height: 11' 2"
- Overall width:
 - 100" Body
 - 9' 8" Mirror to Mirror
- Overall length: 42' 4"
- Actual Weight – May 2022???
 - Fully equipped with all tanks full and no personnel onboard
 - ✓ Front axle – 23,000 lbs (GAWR)
 - ✓ Rear axles – 54,000 lbs (GAWR)

Safety Systems



- **Automatic Traction Control (ATC)**
 - applies the service brake to a spinning wheel so that the torque can be transferred through the differential to the wheel that has the traction
 - reduces engine torque when both wheels are spinning to improve traction
 - ATC light located in the cab will light when the ATC feature is active
 - May be momentarily disengaged by “Offroad Traction” switch
- **Electronic Stability Control (ESC)**
 - stabilizes the vehicle during cornering maneuvers
 - Compares where you are steering and where the vehicle is actually going
 - Intervenes by applying the brakes to individual wheels asymmetrically in order to create torque about the vehicle's vertical axis
 - system may reduce engine power or operate the transmission to slow the vehicle down

Powertrain Systems



- Motor: Cummins X12 500hp
- Transmission: Allison 4000 EVS 5-speed
 - TES-295 synthetic fluid
- Maximum speed is 60 mph
- Motor oil checked via front grille
- Transmission level can be checked via the keypad



Transmission Fluid



- Fluid level check
 - Selector in Neutral
 - Temperature 140 to 220°F
 - Engine at idle and parked for >2 minutes
 - Level ground
- Press both arrow buttons simultaneously to check fluid level; status displayed on selector pad screen
- OL will be followed by OK, -1 thru -7, or +1 thru +7.
 - The – indicates under filled and the + indicates overfilled.
 - The numeral indicates the number of quarts.
- Any other message indicates a problem and CMF should be notified.
- Always confirm the digital reading by visually checking the dipstick BEFORE adding fluid.



Cab Tilt



- There is an inflatable air bladder between the cab and body
- Bladder **MUST** be deflated before raising and/or lowering cab
- Bladder and tilt controls located on front wall of O1 compartment



Always secure loose items in the cab and verify clearances BEFORE tilting the cab!

Cab Tilt



- Confirm no overhead or front bumper obstructions
- Turn ON cab master (battery) switch
- Plug in controller
- Flip Air Bladder switch
- Wait 20 seconds for air to dump
- Press UP on controller until safety arm engages
- Turn OFF master (battery) switch



Bladder will re-inflate

Cab Lowering



- Turn ON cab master (battery) switch
- Flip Air Bladder switch
- Plug in controller
- Wait 20 seconds for air to dump
- SLIGHTLY raise cab
- While pulling release cable press and hold DOWN until red light goes out
- Turn off Air Bladder and Master (battery) switch



Bladder will re-inflate

Cab Tilt CAUTIONS



THIS CAB IS MUCH LONGER AND TALLER

Cab MUST be tilted outdoors

Always...verify clearances, secure loose items, and engage the safety arm



**16 FEET
REQUIRED**

Data Plate



REFER TO YOUR OWNERS MANUAL BEFORE OPERATING

	DATE MFG.	MODEL#	VIN	SO#
	04/28/2020	GA4H03KPA7	4S7AX2E94LC087258	87258
CUSTOMER SERVICE (800) 867-6478			GROSS H.P. 500 @ RPM 2000 GOVERNED RPM 2000	

MODEL	S/N	FLUID CAP	FLUID TYPE
ENGINE X12	75087318	46 QTS	15W40
ENGINE COOLANT		54.1 QTS	EXT LIFE
DIESEL EXH FLD		24 QTS	DEF
TRANSMISSION 4000EVS	6610598279	39 QTS	TES-295
T-CASE/GEAR BOX		PTS	
FRONT AXLE MFS20133ANK36	LRS01475853	1 PTS	80W90
REAR AXLE RP26185NFKF388-538	LRS01476207	56.1 PTS	85W140
(2) REAR AXLE RR26185NCKF388-538	LRS01476211	36.1 PTS	85W140
STRG. GEAR TAS85020A	06620H37T34	8 QTS	DEXRON3
PRI A/C COOLING		7.25 LBS	R134A
AUX A/C COOLING		LBS	
A/C LUBE		16.9 OZ	PAG
CAB TILT DTS-40081	2009701	6.8 QTS	DEXRON3
APPARATUS PUMP		PTS	
GENERATOR		QTS	

TIRES: FRONT: 425/65R 22.5 XZY3	REAR: 12R 22.5 XDN2
828 KPA/COLD 120 PSI COLD	828 KPA/COLD 120 PSI COLD
MAX TIRE SPEED: 104 KPH 65 MPH	120 KPH 75 MPH

MAX GVWR/PNBV 34927 KG/ 77000 LBS	EXT PAINT NO EXT B/LINE
FRT GAWR/PNBE 10433 KG/ 23000 LBS	EXT PAINT UP LOWER EXTERNAL PAINT COLO
REAR GAWR/PNBE 24494 KG/ 54000 LBS	EXT PAINT LWR RED FBCH 937127
	INT PAINT M-T SILVERGRAY

Data Plate

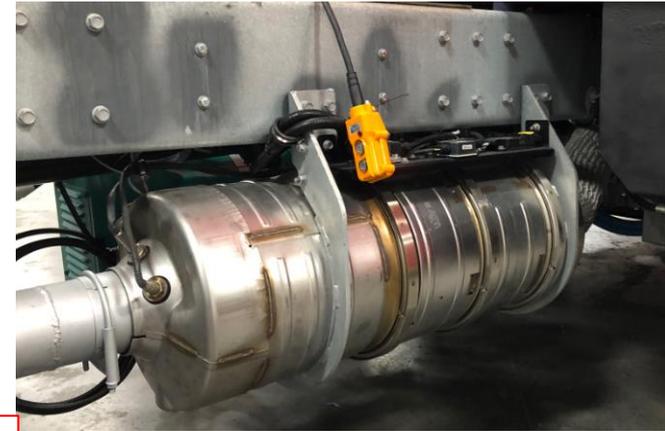


	PL Custom Body and Equipment Co., Inc. 723-223-1411		Job# R332
<u>Equipment</u>	Qty.	Type	
Jenny Compressor Oil	1 Gal.	ISO-100 Jenny Ultimate Blue Synthetic	
Hydra-Qube Hydraulic Oil	3-5 Quarts	AW 46	
Stadco Generator Oil	10 Quarts	Valvoline Premium Blue TM, 8600 ES, SAE 15W-40	
Stadco Generator Antifreeze Coolant	14 Quarts	Zerex G 48 ethylene glycol based, 50/50 Prediluted Coolant	

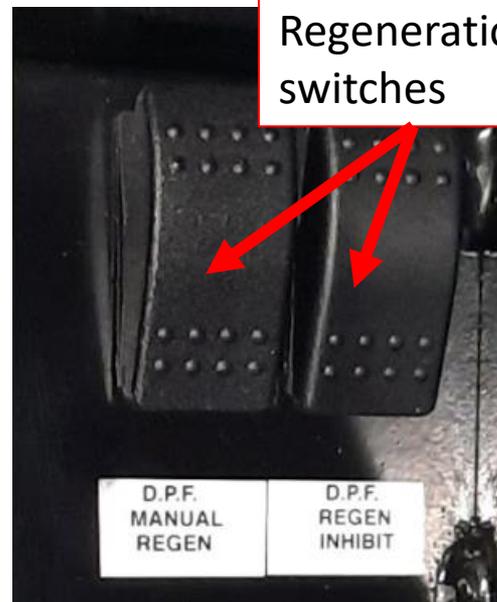
After-Engine Exhaust Treatment

- Vehicle is equipped with diesel exhaust fluid and a diesel particulate filter

See [Cummins After-Engine Treatment Brochure](#) for more info.



DPF and exhaust temp warnings



Regeneration switches



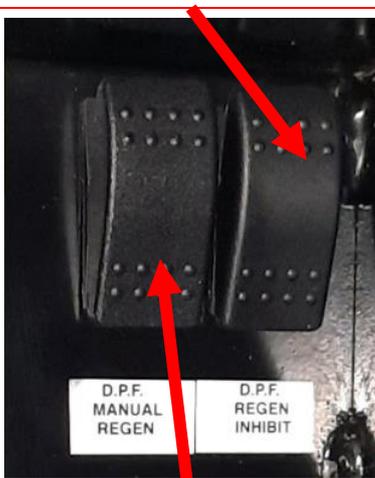
Regeneration Indicators



	<p>The Diesel Particulate Filter (DPF) light will illuminate when a regeneration is necessary. There are progressive stages of need for regeneration indicated by this light:</p>
	<p>1. On solid (low to medium levels of particulate build up). The vehicle requires regeneration but should be able to complete its mission before a regeneration is performed.</p> <ul style="list-style-type: none"> — Ensure the Regen Inhibit Switch is not activated. — Initiate a DPF regeneration by switching to a more challenging duty cycle (such as highway driving for at least 20 minutes or pumping) — OR perform a parked regeneration.
	<p>2. Flashing (medium to high levels of particulate build up). The vehicle requires a regeneration as soon as possible).</p> <ul style="list-style-type: none"> — Perform a regeneration by switching to a more challenging duty cycle or a parked regeneration.
	<p>3. Flashing with amber Check Engine light (high level of particulate build up). A DPF regeneration is required immediately.</p> <ul style="list-style-type: none"> — An automatic regeneration will not initiate. The operator must perform a parked regeneration.
	<p>4. If a parked regeneration is not performed the red Stop Engine lamp will illuminate.</p> <ul style="list-style-type: none"> — As soon as it is safe to do so, the vehicle should be stopped and remain shut down until serviced by an authorized dealer.

Active Regeneration

Prevents system from entering or continuing in active regeneration mode; used when regen may engage in an undesirable location



Used to manually initiate a parked regeneration; DPF lamp must be illuminated to engage

- Due to the type of travel typical of fire apparatus “active regeneration” is most common
- Active regeneration occurs:
 - a. When an intervention by the operator during travel or pumping operations creates correct conditions for regen
 - Requires sufficient exhaust flow and temperatures
 - Speedometer >5mph
 - NO engine speed variations will occur when pumping or driving
 - b. Manually by activating the DPF Regen switch while parked

Regeneration will not effect motor RPM during PTO operations if it engages automatically.

Parked Regeneration

						
DPF LAMP MUST BE ON OR FLASHING	STOP IN SAFE LOCATION	SET PARKING BRAKE	SET SAFE ZONE AROUND EXHAUST	FOOT OFF THROTTLE, BRAKE	HOLD REGEN SWITCH 5 SECONDS	MONITOR AREA STOP ENGINE FOR UNSAFE CONDITIONS!!
PRESSING BRAKE, THROTTLE, REGEN INHIBIT SWITCH WILL STOP REGENERATION PROCESS						
<ol style="list-style-type: none"> Stop vehicle completely, transmission in N (neutral), and set the parking brake. <ul style="list-style-type: none"> Park on a clean surface that will not melt or burn (clean concrete or gravel, not grass or asphalt). Engine control should be from accelerator pedal (not PTO, remote PTO, cruise, etc) PTO and running at normal idle (high idle should be OFF). Clear exhaust outlet area 5 ft of any items, gasses, vapors that can melt, burn or explode. If indoors, exhaust discharge pipe must be rated at least 1500°F (816°C). Keep foot off the throttle pedal and the brake pedal. 						
⚠ CAUTION						
<p>STAY with the vehicle. Monitor the area during the operation. if any unsafe conditions occur, shut off engine immediately!</p> <p>NOTE: Diesel Particulate Filter (DPF) lamp must be ON in order to start a stationary regeneration.</p> <ol style="list-style-type: none"> With the engine running, press and hold the vehicle's regeneration switch for several seconds. <ul style="list-style-type: none"> Engine speed increases. The turbocharger may make a different sound during the event. DEF lamp turns OFF. As hydrocarbons are added, temperature goes up. HEST lamp illuminates when exhaust temperature reaches 977°F (525°C). Regeneration may take 20-40 minutes or more, depending on soot level. Exhaust temps stay high at least 3-5 minutes after completion. To stop a regeneration before completion, depress throttle pedal, release parking brake, press the regeneration inhibit switch, or turn off the engine. When the regeneration is complete, the engine returns to normal idle speed and operation. <ul style="list-style-type: none"> If excessive soot remains in the filter, the DPF light(s) will return to the appropriate stage until another regeneration occurs. Repeat parked regeneration. If the DPF light still remains on, call for service. 						

Do not perform regen inside a building or while attached to an exhaust removal system!

A minimum of 5 feet of clearance is required to the exhaust outlet.

When operating it may be necessary to inhibit regen if clearances to the exhaust are not available!

Fuel & DEF



- Diesel Fuel
 - Fills on both sides of the apparatus at the rearmost wheel well
 - 68 gallon capacity
- Diesel Exhaust Fluid (DEF)
 - Fluid level displayed on dashboard gauge
 - 6 gallon tank
 - Fill inside left rear cab door
 - Must open access panel
 - Light blue cap



Exhaust System



- Exhaust outlet is 6" diameter
 - Pierce is 5"
- PlymoVent boots will accept up to 6 ¼" exhaust outlets
 - **The fit is tight!**
- Check your mirror to ensure the hose disengages from the exhaust when exiting the station
- Until the rubber molds to the larger tailpipe the boot may need to be manually disengaged

PLYMOVENT®



**Slow and steady
departures from the bay
are necessary.**

Suspension & Brake Systems



- 23,000lb front axle
- 54,000lb rear axles
- Parking brake
 - 2nd actuator located on officer's dash
- Supplemental Brake for front axle
- Anti-lock disc air brakes front and rear axle
- 26 cfm air compressor
- 12v auxiliary air compressor behind driver seat
 - Powered by shoreline to maintain brake system while parked
- Heated air dryer
- Air tank drain actuators – driver side under D2 compartment



Officer side parking brake switch



Suspension & Brake Systems



- Front axle has traditional leaf springs
- Rear axles have Neway AD-254 air suspension
 - Axles independently suspended
 - Dual height control valves ensure equal frame height regardless of loads



Brakes – Front & Rear Axle



Meritor DiscPlus EX225 Disc



Pads must be replaced at 3mm (approximately 1/8")

For additional information go to the [Meritor Maintenance Manual](#)

Brakes – Front Axle



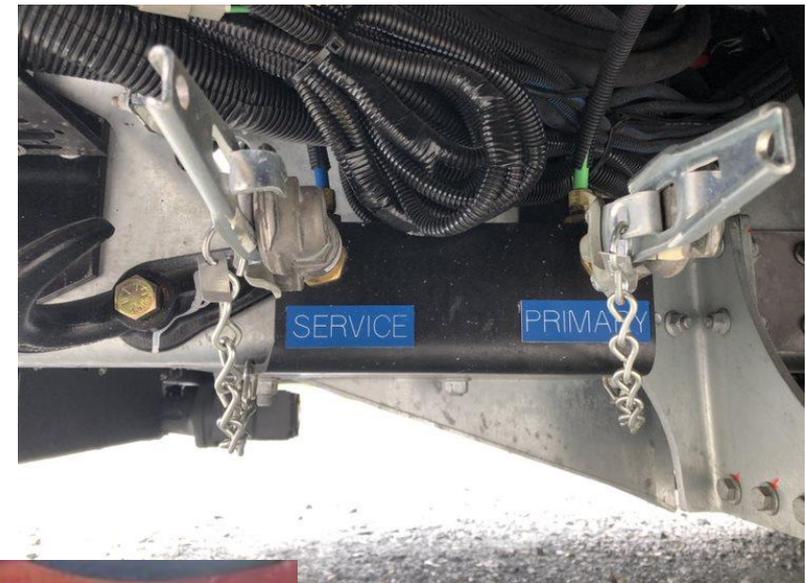
- Front axle has supplemental parking brake
- Requires rear parking brake to be set first
- Protection valve located in center of dash
- HIGHLY Recommended for winching



Jumper Studs & Glad Hands



- Glad hands located under front of unit
- Jumper studs located in driver door step well near shoreline



Snow Chains



- OnSpot automatic snow chains on drive axle
- Locking switch located on dashboard above HVAC controls
- The On-spot chains have a 5 second delay before they activate. This is done to prevent accidental activation.



Shoreline



- 2 Independent 20-amp inlets
- Lower yellow cover is for chassis shoreline
- Upper blue cover is for portable tool charging

**These are not auto-eject plugs.
Must be unplugged manually before
closing the cab door.**



Shoreline



- 20 amp, 120v NEMA 5-20 plug with Kussmaul display
- Driver's door must remain open when shoreline is connected
- Supplies Kussmaul 35 amp battery conditioner and auxiliary air compressor



**This is not an auto-eject plug.
Must be unplugged manually
before closing the cab door.**

Keyless Entry



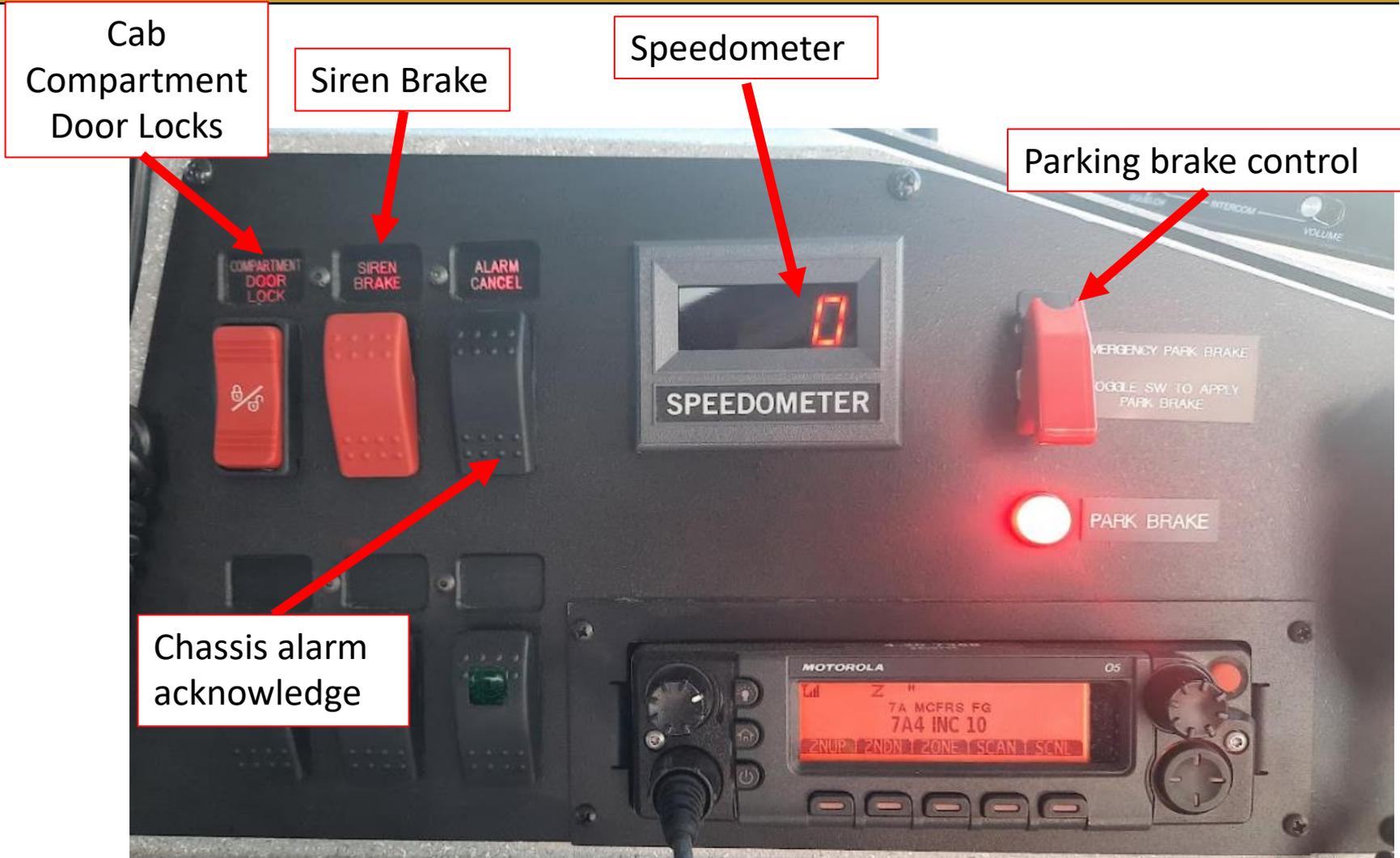
Portable Tool Power



- Only provides power to power strips in D1/O1 for equipment charging
- Blue cover

**This is not an auto-eject plug.
Must be unplugged manually before
closing the cab door.**

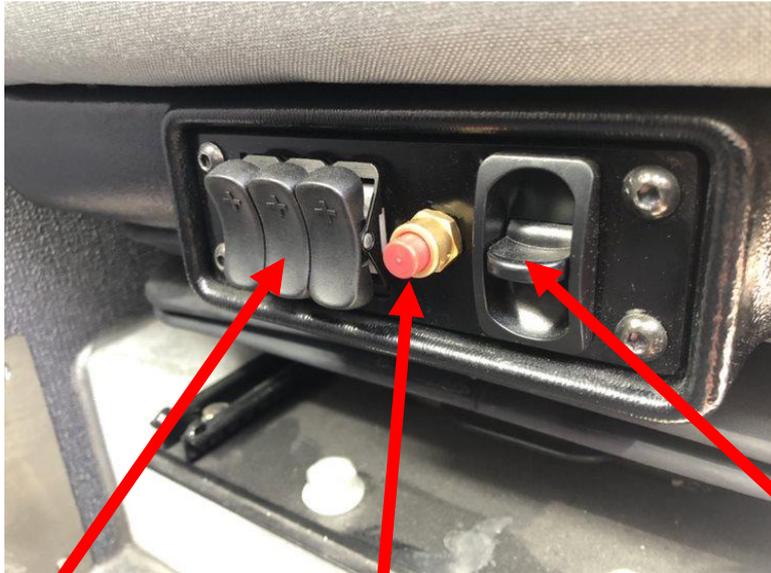
Officer Seat Area



Dashboard Display



Driver's Seat



Pneumatic Lumbar Support

Pneumatic release
Press to release lock to
adjust seat forwards and
backwards

Pneumatic Lumbar Support



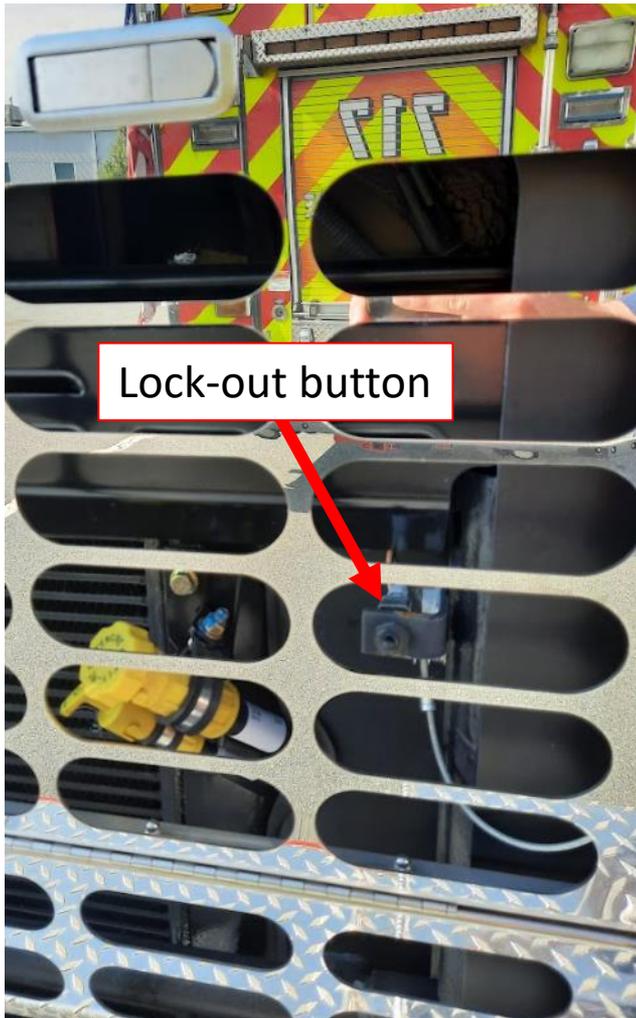
Warning Light Controls



- Master switch located on center dash



Cab/Compartment Door Locks



- Electric door locks on cab entry doors
 - Not connected to body compartments
- Lock-out switch located behind front grill near oil fill
- Key FOBs also provided

Starting & Stopping the Motor

- Battery switch (MASTER), ignition switch, and start button are all grouped to left of steering wheel

Battery
switch

Ignition switch
-ON for run
-OFF to shut off

Press to start
the motor.
Engage for no
more than 15
seconds.



In addition to the battery, ignition switch must be “on” for most electrical functions to work (like cab tilt)

Allow gauges to complete their sweep before attempting to start the motor. Failure to wait can result in false sensor alarms.

Starting & Stopping the Motor



DO NOT leave the ignition switch in the ON position when the vehicle is not running.



Sequence of Master then Ignition is critical for Start-up

Driver's Dash Controls



Driver's Dash Controls

Headlights
Up – Headlights
Middle – Marker Lights
Down - OFF

Mud/Snow
Momentarily impairs ATC to allow more wheel spin; may be desirable in extra soft surfaces like snow, gravel, or mud

Chains
Pressing the switch up activates On-Spot Chains



Seatbelt Indicator

Engine Brake
Up – ON
Down - OFF

Engine Brake
Up – High
Middle - Medium
Down - OFF

Heated Mirror
Pressing the switch up turns on mirror heat

Driver's Dash Controls

Auto Lube
Fault???

Compartment
Locks

Differential Lock
Locks drive axle side to
side for improved traction

Interaxle Lock
Engages secondary rear
axle for improved traction



Horn Function
Up – Siren
Middle - Horn
Down – Air Horn

Wiper
Controls

Dash
Dimmer

HVAC Controls

Rear Camera



- Located above the rear floodlight
- Monitor flips down
- Always active



Reverse Floodlights



- Floodlights activate when transmission placed in reverse
 - Rear flood
 - Rear-most flood on both sides



SCBA Brackets – SmartDock



- No straps or levers to restrain the SCBA or to release the SCBA - blue latching mechanism holds the SCBA in place during transit.
- In the event of a collision, inertial forces cause the top latching mechanism to lock the SCBA in place, preventing it from becoming a projectile.
- **To release the SCBA, a smooth motion is required. Slow is smooth; smooth is fast.**
- With the SCBA straps donned, the wear should bend forward at the waist and stand up to release the tank from the upper claw.
- If the tank is too loose or too tight within the claw there is an adjustment knob on top of the bracket.



For additional information view a quick video at

<https://www.youtube.com/watch?v=y43vJK3bsVo&app=desktop> or check out the manufacturer's website at <https://www.imminet.com/products/fire-ems/smartdock/>

PTO Generator



- 35kW Onan
- Located under walk-in behind D1 compartment
- PTO located at 8 O'clock on transmission
- Requires parking brake activation to engage
- Engine speed under 900rpm to engage
- Disengages over 1440rpm



PTO Generator



- Locking switch on center of dash to start
- NOT to be used with vehicle in motion



PTO Generator



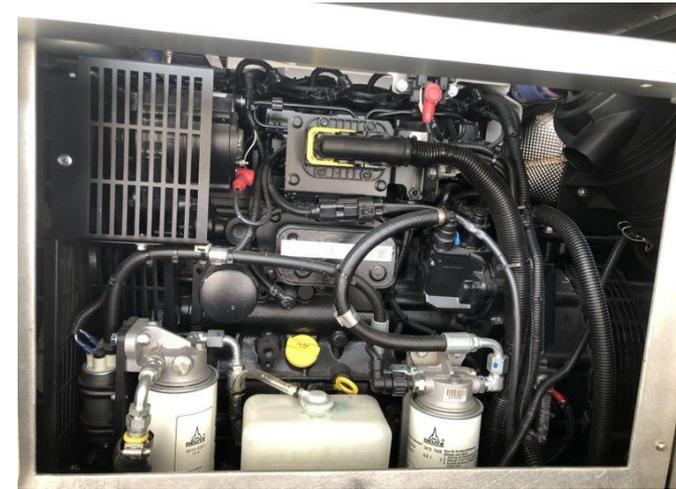
- Display above breaker panel in D1 compartment
- FROG-D (Frequency Readout of Generator Display)
- Displays Frequency, AMPS, and Volts
- MODE button toggles to generator hours



Diesel Generator



- Stadco 18kW run, 22kW peak
- Can only be started in O2 compartment
- Generator located in center of body behind 3rd and 4th body compartments
- Access panel behind saws on O3 compartment



Diesel Generator Start-up



- Set Main load circuit breaker to "OFF"
- Set Transfer Switch to position 2
- Move toggle switch position to "ON"
- Press "RUN"
- Display can be used to check hours and load



Diesel Generator



- Has air plenum with 4-120v AC Fans
- Fans draw air from intakes at top right rear of vehicle
- Air cools generator
- Bottom right breaker in panel MUST be on when generator is running



Power Distribution



- Breaker Panel in D1 Compartment
- All breakers clearly labeled
- Major items requiring AC power:
 - Light Tower
 - Air Compressor
 - Plasma Cutter



Cord Reels and Outlets



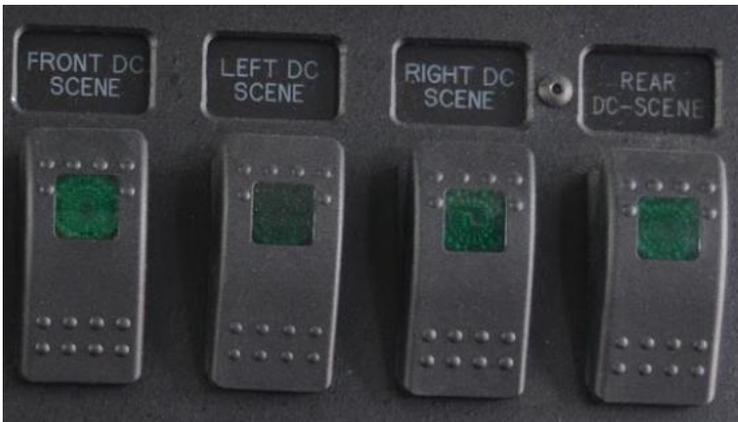
- Hannay cord reels located in D2/O2 compartments
 - 200 feet of 10/4 wire
- Outlets located on both sides of body
 - Each side of front bumper
 - Each side at rear wheel well
- 20 foot pigtail for plasma cutter
 - 250V / 100 Amp, 2-pole/3-wire watertight plug



Scene Lighting



- All body mounted scene lights are 12v LED
 - Controlled in the cab
- 2 Brow Lights
- 3 Body Lights per side
- 1 Rear Light



Light Tower



- Will-Burt Night Scan PowerLite
 - 6 150W LED light heads
 - Controller in D2 compartment
 - Tower operates on chassis air and 12v DC power
 - Lights operate on 120v AC power

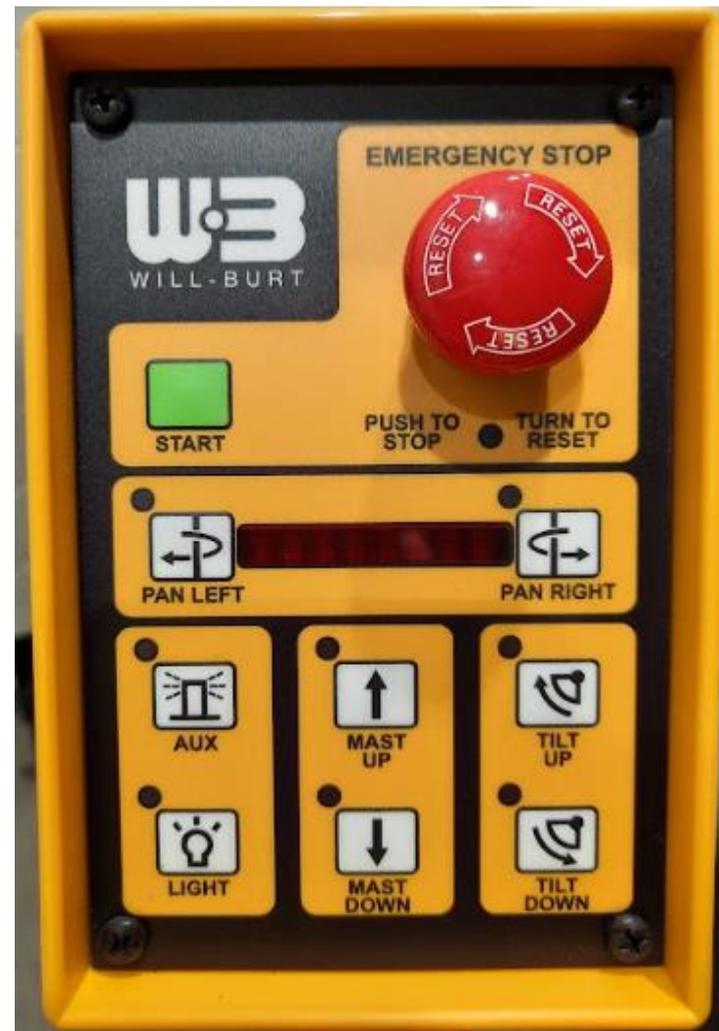


Light Tower



• Controller Functions

- | | | | | | |
|---|-------------|---|-----------------|---|-----------|
|  | Start/ Stop |  | Auxiliary Light |  | Lights |
|  | NFPA Start |  | Pan Left |  | Pan Right |
|  | Mast Up |  | Tilt Up | | |
|  | Mast Down |  | Tilt Down | | |



Light Tower – Start-up



- Parking Brake MUST be engaged
- Ensure no overhead obstructions
- Ensure generator is on
- Ensure E-Stop is not activated
- Press Green Start button to power-up the mast

Light Tower – Start-up



- Raise Mast
 - Double tapping "Mast Up" will take mast to 90 and turn on all lights
 - Pressing and holding "Mast Up" will only operate while pressing the button (lights must be manually activated)
- Raise mast to desired height
- Tilt and Pan as desired

Light Tower – Stowing



- Double tap "Mast Down" button to Auto Stow
 - Auto Stow is recommended
- If not using Auto Stow press and hold "Mast Down" button until all LED's on controller turn off

Manual Transfer Switch



- Located on front wall of walk-in compartment
- Transfer should be made under NO electrical load
- Complete transfer before starting generators or turn off main breaker first



Air Compressor



- Jenny Air Compressor
 - Rated to produce 27.2cfm at 175psi
 - 2 air storage tanks located in D2/O2 compartment
 - 15 gallons each



Air Compressor



- Compressor located on top rear of vehicle
 - Fans integrated into compartment for cooling



Air Compressor



- Controls to start compressor in D2/O2 compartments



Air Compressor



- Tank drain located on front wall of O2 compartment



Air Compressor



- Weekly maintenance requirements marked on compressor



Air Distribution



- Controls in D2 compartment for
 - Driver air reel (200' ½" hose, 120psi)
 - Rear body connection



Air Distribution



- Controls in O2 compartment for:
 - Officer air reel (200' ½" hose)
 - Front bumper connection



NOTE difference between compressor and chassis connections

Winches



- Front and Rear winches are BOTH PTO driven
- Same controller works both winches
- Uses Harrison Hydra-Qube hydraulic system
- PTO located at 8 O'clock on transmission
- Only able to operate one at a time



Winches – Hydra-Qube



- All-in-one system
 - Reservoir
 - Heat Exchanger
 - Filter
- Monted on roof near light tower
- Contains 4.75 gallons of AW-46 hydraulic fluid



Winches - Operation



- Transmission **MUST** be in neutral
- Parking brake **MUST** be applied
- Turn on Winch PTO locking switch
- Select desired winch
 - Up for Front
 - Down for Rear



Front Winch



- Ramsey H-600 Hydraulic Worm Gear Winch
- Manual lever style clutch
- 12,000 pound pull rating (1st Layer)
- Rope: Plasma 12 Strand, ½” diameter
 - 31,300 lb. minimum tensile strength
 - 7 layers on the drum, 225 ft of useable length

Rear Winch

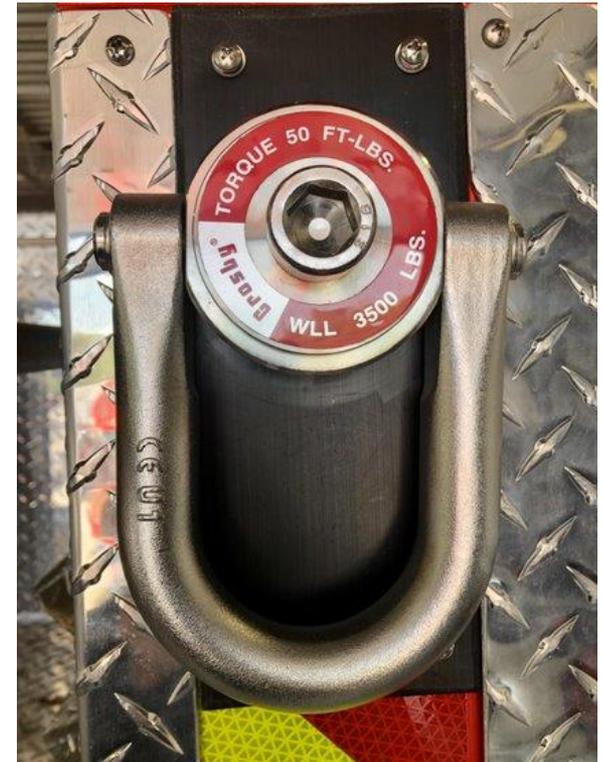


- Ramsey H-800 Hydraulic Worm Gear Winch
- Type: Hydraulic Worm Gear
- Rated Line Pull: 25,000 lbs. (1st layer)
- Clutch Type / Control: Blocked, Dow-Lok/ Air Controlled
- Rope: Plasma 12 Strand, 7/8" diameter
 - 92,600 lb. minimum Tensile strength
 - 4.5 layers on the drum, 135 ft of useable length

Anchor Points



- Crosby Swivel Tie Points (Upper Body)
 - 3 on each side of body
 - 2 on rear
 - 3500lb Working Load Limit
- Rigging Receivers
 - 2 on each side of body
 - 1 centered between rear axles in body
 - 1 below body at rear corner
 - 12,000lb straight pull rating
- Rear Rings (Tow Hooks)
 - 25,000 straight pull rating



Additional Resources



This document and other supporting documents are available at:
[Driver Training Knowledgebase \(montgomerycountymd.gov\)](https://montgomerycountymd.gov/driver-training-knowledgebase)



Members of the apparatus committee:

- Assistant Chief Pete Friedman
- Program Manager Steve Lamphier
- Battalion Chief Monte Fitch
- Captain Mike Green (Station 29)
- Emergency Services Coordinator Ernie Krouse